

FIG. 1

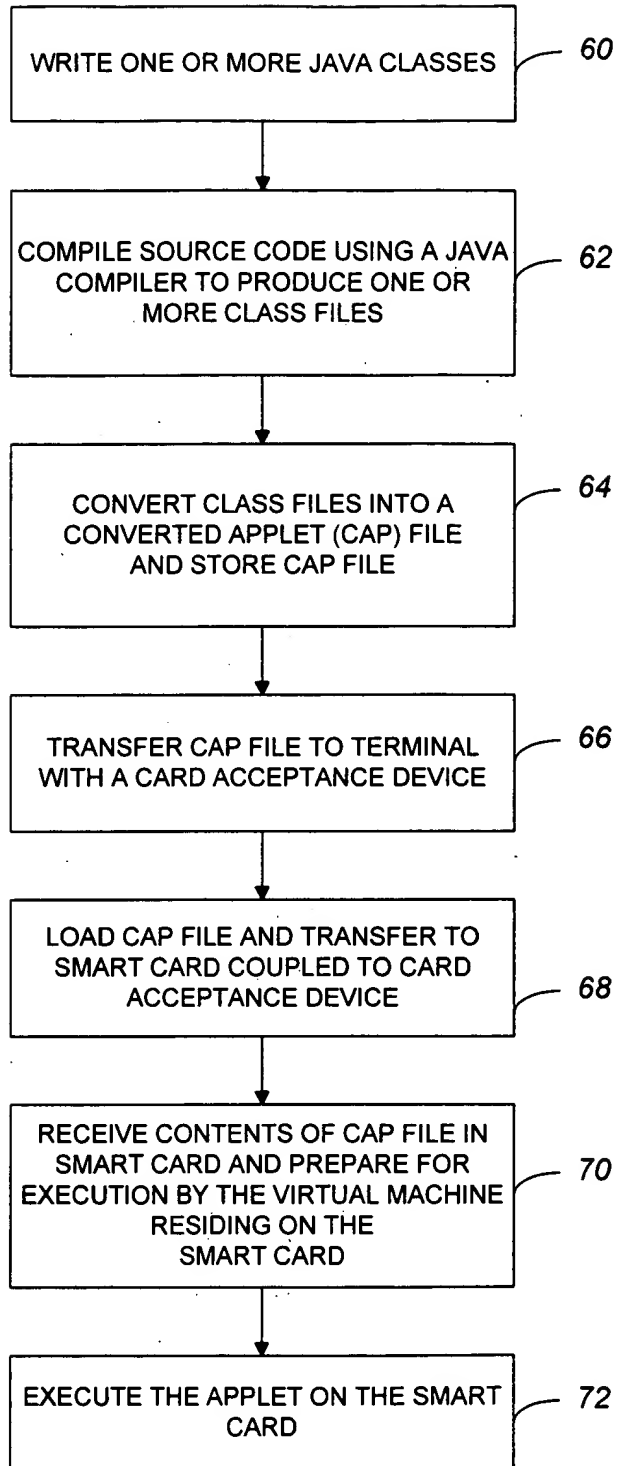


FIG. 2

APPROVED	O.G. FIG.	
BY	CLASS	SUBCLASS
DRAFTSMAN		

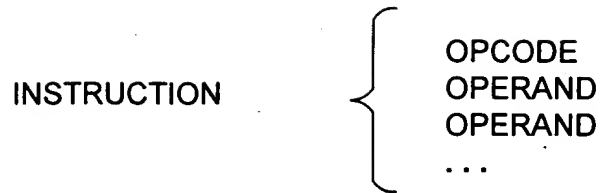


FIG. 3A

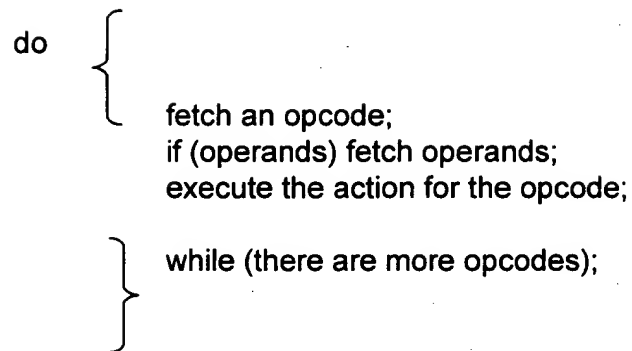


FIG. 3B

APPROVED	C. G. FIG.
BY	CLASS/SUBCLASS
DRAFTSMAN	

0	nop	47	sstore_0	94	i2s	141	invokestatic
1	aconst_null	48	sstore_1	95	icmp	142	invokeinterface
2	sconst_m1	49	sstore_2	96	ifeq	143	new
3	sconst_0	50	sstore_3	97	ifne	144	newarray
4	sconst_1	51	istore_0	98	iflt	145	anewarray
5	sconst_2	52	istore_1	99	ifge	146	arraylength
6	sconst_3	53	istore_2	100	ifgt	147	athrow
7	sconst_4	54	istore_3	101	ifle	148	checkcast
8	sconst_5	55	aastore	102	ifnull	149	instanceof
9	iconst_m1	56	bastore	103	ifnonnull	150	sinc_w
10	iconst_0	57	sastore	104	if_acmpeq	151	iinc_w
11	iconst_1	58	lastore	105	if_acmpne	152	ifeq_w
12	iconst_2	59	pop	106	if_scmpeq	153	ifne_w
13	iconst_3	60	pop2	107	if_scmpne	154	iflt_w
14	iconst_4	61	dup	108	if_scmplt	155	ifge_w
15	iconst_5	62	dup2	109	if_scmpge	156	ifgt_w
16	bspush	63	dup_x	110	if_scmpgt	157	ifle_w
17	sspush	64	swap_x	111	if_scmple	158	ifnull_w
18	bipush	65	sadd	112	goto	159	ifnonnull_w
19	sipush	66	iadd	113	jsr	160	if_acmpeq_w
20	iipush	67	ssub	114	ret	161	if_acmpne_w
21	aload	68	isub	115	tableswitch	162	if_scmpeq_w
22	sload	69	smul	116	itableswitch	163	if_scmpne_w
23	iload	70	imul	117	lookupswitch	164	if_scmplt_w
24	aload_0	71	sdiv	118	lookupswitch	165	if_scmpge_w
25	aload_1	72	idiv	119	areturn	166	if_scmpgt_w
26	aload_2	73	srem	120	sreturn	167	if_scmple_w
27	aload_3	74	irem	121	ireturn	168	goto_w
28	sload_0	75	sneg	122	return	169	getfield_a_w
29	sload_1	76	ineg	123	getstatic_a	170	getfield_b_w
30	sload_2	77	sshl	124	getstatic_b	171	getfield_s_w
31	sload_3	78	ishl	125	getstatic_s	172	getfield_i_w
32	iload_0	79	sshr	126	getstatic_i	173	getfield_a_this
33	iload_1	80	ishr	127	putstatic_a	174	getfield_b_this
34	iload_2	81	sushr	128	putstatic_b	175	getfield_s_this
35	iload_3	82	iushr	129	putstatic_s	176	getfield_i_this
36	aaload	83	sand	130	putstatic_i	177	putfield_a_w
37	baload	84	iand	131	getfield_a	178	putfield_b_w
38	saload	85	sor	132	getfield_b	179	putfield_s_w
39	iaload	86	ior	133	getfield_s	180	putfield_i_w
40	astore	87	sxor	134	getfield_i	181	putfield_a_this
41	sstore	88	ixor	135	putfield_a	182	putfield_b_this
42	istore	89	sinc	136	putfield_b	183	putfield_s_this
43	astore_0	90	iinc	137	putfield_s	184	putfield_i_this
44	astore_1	91	s2b	138	putfield_i	...	
45	astore_2	92	s2i	139	invokevirtual	254	impdep1
46	astore_3	93	i2b	140	invokespecial	255	impdep2

FIG. 4A

APPROVED	C. G. FIG.
BY	CLASS/SUBCLASS
DRAFTSMAN	

aaload	36	land	84	iload_0	32	putstatic_s	129
aastore	55	lstore	58	iload_1	33	ret	114
aconst_null	1	icmp	95	iload_2	34	return	122
aload	21	iconst_0	10	iload_3	35	s2b	91
aload_0	24	iconst_1	11	ilookupswitch	118	s2i	92
aload_1	25	iconst_2	12	imul	70	sadd	65
aload_2	26	iconst_3	13	ineg	76	saload	38
aload_3	27	iconst_4	14	instanceof	149	sand	83
anewarray	145	iconst_5	15	invokeinterface	142	sastore	57
areturn	119	iconst_m1	9	invokespecial	140	sconst_0	3
arraylength	146	idiv	72	invokestatic	141	sconst_1	4
astore	40	if_acmpeq	104	invokevirtual	139	sconst_2	5
astore_0	43	if_acmpeq_w	160	ior	86	sconst_3	6
astore_1	44	if_acmpne	105	irem	74	sconst_4	7
astore_2	45	if_acmpne_w	161	ireturn	121	sconst_5	8
astore_3	46	if_scmpeq	106	ishl	78	sconst_m1	2
athrow	147	if_scmpeq_w	162	ishr	80	sdiv	71
baload	37	if_scmpge	109	istore	42	sinc	89
bastore	56	if_scmpge_w	165	istore_0	51	sinc_w	150
bipush	18	if_scmpgt	110	istore_1	52	sipush	19
bspush	16	if_scmpgt_w	166	istore_2	53	sload	22
checkcast	148	if_scмпle	111	istore_3	54	sload_0	28
dup	61	if_scмпle_w	167	isub	68	sload_1	29
dup_x	63	if_scмпlt	108	itableswitch	116	sload_2	30
dup2	62	if_scмпlt_w	164	iushr	82	sload_3	31
getfield_a	131	if_scмпne	107	ixor	88	slookupswitch	117
getfield_a_this	173	if_scмпne_w	163	jsr	113	smul	69
getfield_a_w	169	ifeq	96	new	143	sneg	75
getfield_b	132	ifeq_w	152	newarray	144	sor	85
getfield_b_this	174	ifge	99	nop	0	srem	73
getfield_b_w	170	ifge_w	155	pop	59	sreturn	120
getfield_i	134	ifgt	100	pop2	60	s shl	77
getfield_i_this	176	ifgt_w	156	putfield_a	135	s shr	79
getfield_i_w	172	ifle	101	putfield_a_this	181	sspush	17
getfield_s	133	ifle_w	157	putfield_a_w	177	sstore	41
getfield_s_this	175	iflt	98	putfield_b	136	sstore_0	47
getfield_s_w	171	iflt_w	154	putfield_b_this	182	sstore_1	48
getstatic_a	123	ifne	97	putfield_b_w	178	sstore_2	49
getstatic_b	124	ifne_w	153	putfield_i	138	sstore_3	50
getstatic_i	126	ifnonnull	103	putfield_i_this	184	ssub	67
getstatic_s	125	ifnonnull_w	159	putfield_i_w	180	stableswitch	115
goto	112	ifnull	102	putfield_s	137	sushr	81
goto_w	168	ifnull_w	158	putfield_s_this	183	swap_x	64
i2b	93	iinc	90	putfield_s_w	179	sxor	87
i2s	94	iinc_w	151	putstatic_a	127		
iadd	66	iipush	20	putstatic_b	128		
iaload	39	iload	23	putstatic_i	130		

FIG. 4B

opcode	byte	short	int	reference
Tspush	bspush	sspush		
Tipush	bipush	sipush	lpush	
Tconst		sconst	lconst	aconst
Tload		sload	lload	aaload
Tstore		sstore	lstore	astore
Tinc		sinc	linc	
Taload	baload	saload	laload	aaload
Tadd		sadd	ladd	
Tsub		ssub	lsub	
Tmul		smul	lmul	
Tdiv		sdiv	ldiv	
Trem		srem	lrem	
Tneg		sneg	lneg	
Tshl		sshl	lshl	
Tshr		sshr	lshr	
Tushr		sushr	lushr	
Tand		sand	land	
Tor		sor	lor	
Txor		sxor	lcor	
s2T	s2b		s2i	
i2T	i2b	i2s		
Tcmp			lcmp	
if_TcmpOP		if_scmpOP		if_acmpOP
Tlookupswitch		slookupswitch	llookupswitch	
Ttableswitch		stableswitch	ltableswitch	
Treturn		sreturn	lreturn	areturn
getstatic_T	getstatic_b	getstatic_s	getstatic_i	getstatic_a
putstatic_T	putstatic_b	putstatic_s	putstatic_i	putstatic_a
getfield_T	getfield_b	getfield_s	getfield_i	getfield_a
putfield_T	putfield_b	putfield_s	putfield_i	putfield_a

FIG. 5

APPROVED	C.G. FIG.
BY	C. ADD. SUBCLASS
CRAFTSMAN	

iipush

(Java Card™ Virtual Machine)

Operation: Push integer onto stack

Format:

iipush
byte1
byte2
byte3
byte4

Form: iipush = 20 (0x14)

FIG. 6A

ldc

(Java™ Virtual Machine)

Operation: Push item onto stack

Format:

ldc
index

Form: ldc = 18 (0x12)

FIG. 6B

FIG.	
CLASS	SUBCLASS

checkcast (Java™ Virtual Machine)

Operation Check whether object is of a given type

Format

checkcast
indexbyte1
indexbyte2

Form checkcast = 192 (0xC0)

FIG. 7A

checkcast (Java Card™ Virtual Machine)

Operation check whether object is of a given type

Format

checkcast
atype
indexbyte1
indexbyte2

Form checkcast = 148 (0x94)

FIG. 7B

getfield _ T (Java Card™ Virtual Machine)

Operation Fetch field from object

Format

getfield _ T
index

Forms

getfield _ a = 131 (0x83)
getfield _ b = 132 (0x84)
getfield _ s = 133 (0x85)
getfield _ i = 134 (0x86)

FIG. 8A

getfield (Java™ Virtual Machine)

Operation Fetch field from object

Format

getfield
indexbyte1
indexbyte2

Form getfield = 180 (0xb4)

FIG. 8B

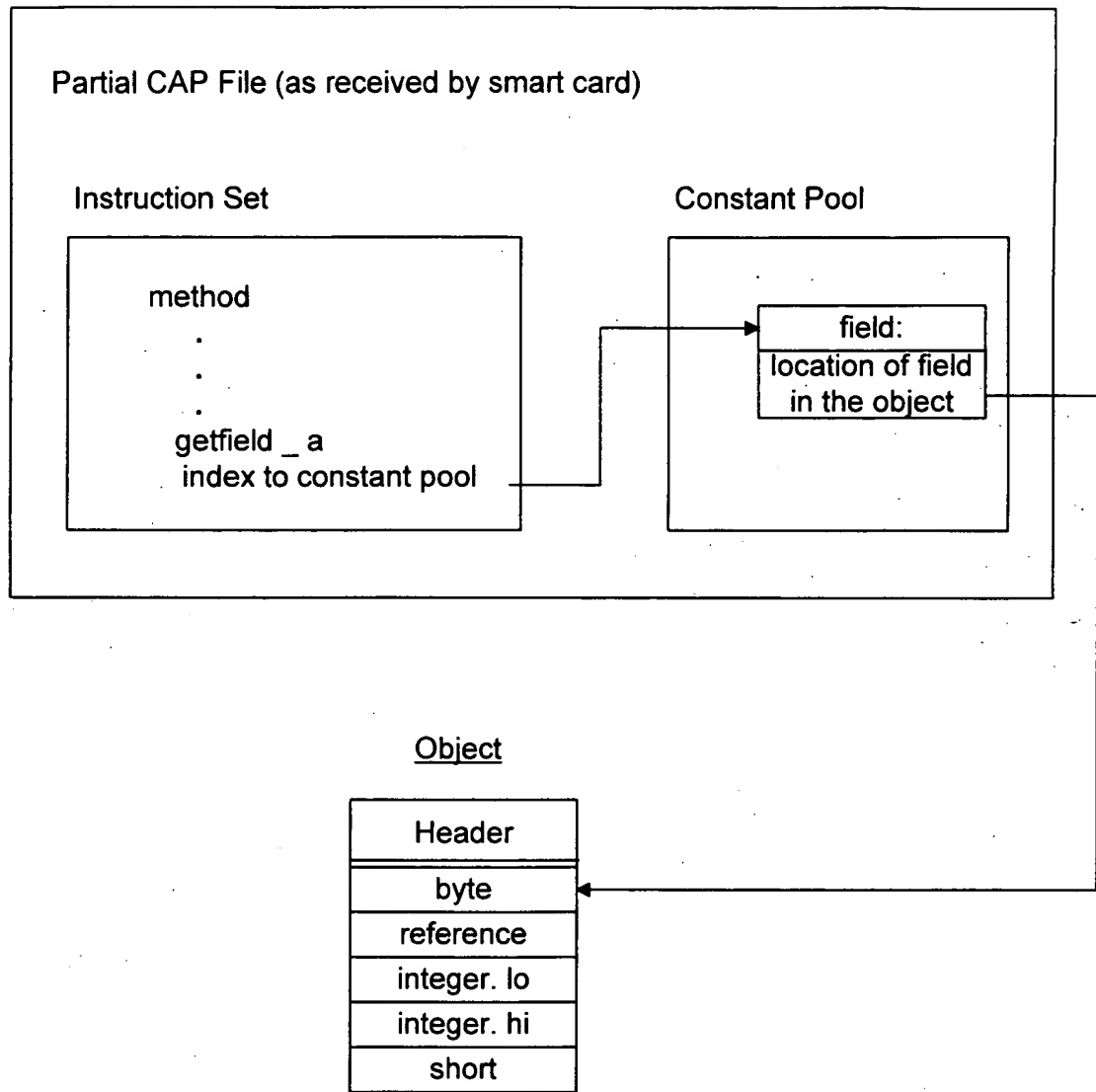
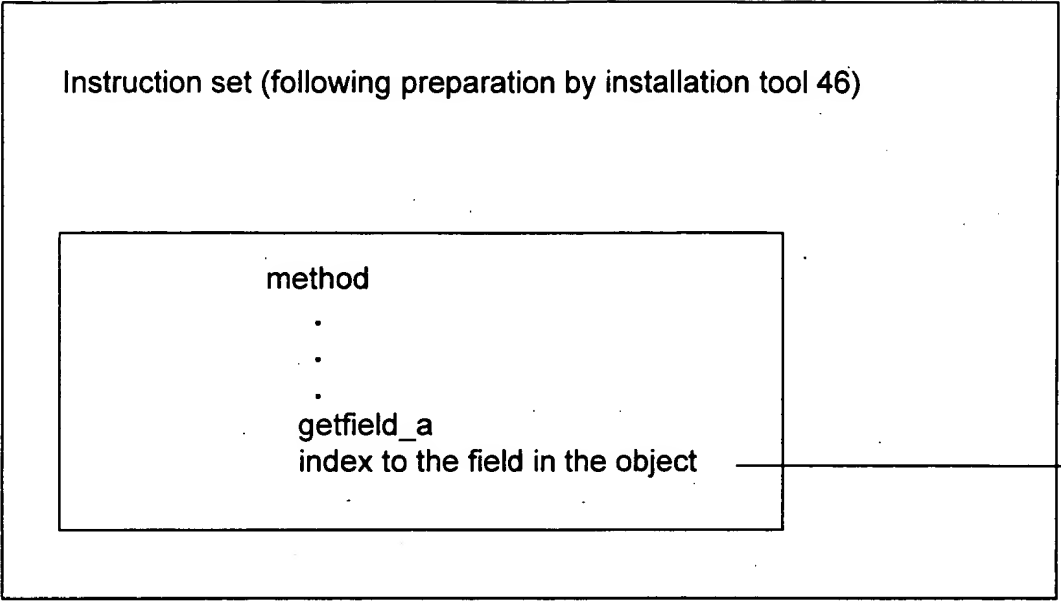


FIG. 9A



Object

Header
byte
reference
integer. lo
integer. hi
short

FIG. 9B

APPROVED	CLASS	SG
BY	CLASS	SUBCLASS

FIG. 10A

aload _ 0
getfield _ a
<index>

FIG. 10B

getfield _ a _ this
<index>

APPROVED	O.G. FIG.
BY	CLASS/SUBCLASS
DATE	

smart cards

cellular telephones

boundary scan devices

field programmable devices

PDA's

paggers

other small or miniature devices

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FIG. 12